مدينة تكنولوجيا الاتصالات والمعلومات
صنعاء - الجمهورية اليمنية
خدمة العملاء 777 777 777 أو 121 مجاناً
info@yemenmobile.com.ye
P.O.Box : 737 Fax : 00967 337999
Tel : 00967 337888

Yemen mobile communication Tower Specification

Steel Normal tower specifications

Towers height (25, 35, 45, 55, 65) m (Green field)

Client: yemen mobile , Amran street ,technology city, Republic of Yemen

1. Design criteria

1. Loading (General)

All design and loading shall be calculated in accordance with one of the following:-

1- BS:-

BS 8100: Part1: 1986; BS 6399: Part1: 1996; Part2: 1997; Part 3: 1988 and BS648: 1964.

2- ANSI/TIA/EIA-222-G

Maximum allowable rotation in top Point..... (0.25 ◉ Deg)

Tower design as non-sway

Self support structure

1.1.1. Main Load

1) Microwave Dish

Diameter..... 1.2m + 1.8m

Weight..... 100 + 135 kg

Location on the Tower ..... At the top, in any direction

NO of Microwave dish ..... (4*1.2m)+ (4*1.8m) pieces

2) GSM antennas

Diminutions..... 0.3x3x0.11

Weight..... 20 kg

Location on the mast ..... at the top, in any direction

NO of GSM antennas ..... 6 pieces

3) Feeder (antennas cables)

Diameter ..... 7/8"

Weight ..... 5 kg / m

Location on the tower ..... From the bottom to the top

NO of cables ..... two cables for each GSM antennas

1.1.2. Secondary Load

Wind Load

Wind speed.....150 km/h

Temperature Load

(-7c◉ – 45c◉) it is the ruing temperature in Yemen.

1.2. Soil Specification

Bearing capacity :-

2 Kg/Cm²

0.7 Kg/Cm²

4.5 Kg/Cm²

مدينة تكنولوجيا الاتصالات والمعلومات
صنعاء - الجمهورية اليمنية
خدمة العملاء 777 777 777 أو 121 مجاناً
info@yemenmobile.com.ye
P.O.Box : 737 Fax : 00967 337999
Tel : 00967 337888

Dead loading

The self-weight of towers including ladders and platforms is based on nominal sizes of members with an appropriate allowance for gussets, bolts and welds.

Wind Loading

Two basic types of towers may be considered and this is

A) "heavy" range.

The heavy range should be designed for a basic wind speed of 41,666 m/s at an altitude of 150m. This data is preliminary and may be altered as soon as more accurate wind information data will be available.

Live Load

Individual members with an angle of 30◉ to the horizontal or less shall be designed to support a 1.5kN vertical point load at mid span.

Towers shall be designed as Class C structures within the Main Road environment as defined in BS 8100: Part 1: 1986; Figure 2.1. or equivalent by ANSI/TIA/EIA-222-G

The serviceability check of the towers will be carried out in accordance with BS 8100 clause 3.3. Or equivalent by ANSI/TIA/EIA-222-G

The rotational displacement for any tower structure shall be limited to 0.5◉ measured at the highest dish level.

1.3 Steelwork

The plan shape of tower is square

For lattice towers all steelwork including angles, flats and round solid bars will be hot rolled Grade S275 or S355 to BS EN 10 025. Also steelwork circular hollow sections will be hot rolled S275 or S355 to BS EN 10 210.

Bolts will be hot dip galvanised in accordance with BS 7371: Part 6: 1998.

All tower parts will be hot dip galvanised in accordance with BS EN ISO 1461and to the minimum thickness specified in Table 2 & 3 of that standard. Areas of galvanising damaged during transport will be renovated as permitted in Section 6.3 of BS EN ISO 1461.

1.4 The maximum height of the floor tower is 5m for easily transports and installation in site.

1.5 The work plats should distribution on height of tower each 10m, except the end work pleat should put on distance 3m from the top of tower.

1.6 Antenna supports

Each tower need the number of antenna supports as following:-

1- GSM antenna . . . . . 6 pieces

2- Microwave antenna . . . . . 8 pieces

1.7 Concrete work

The concrete work should be designed by ACI-318M-05 requirements. Take care for following design criteria:-

1- Concrete strength Fc/28days 21 MPa

2- Reinforcement strength Fy 280 MPa

3- The maximum bars size which use in design reinforcement concrete is 20mm. (Diameter of bar)

1.8 Access & Climbing

All base station towers shall be fitted with a access ladder in part complying with BS 4211. The access system

shall also comprise a GlideLock/RailLock or similar approved system. Sufficient work platforms shall be provided each 10m height of tower.

1.9 Design life

Tower structures:

Minimum structural Design Life shall be 30 years.

Structures below ground:

Minimum structural design life shall be 100 years

1.10 Coating (Thickness of zinc)

Coating should not less 150 µm according ASTM A123 / A123M (Standard Specification for Zinc (Hot-Dip Galvanized) Coatings on Iron and Steel Products).

1.11 Codas and Standards

British Standards/ Code of Practice and Euro standards or find the equivalent which is recommended by ANSI/TIA/EIA 222-G

BS 648 Schedule of weights of building materials

BS 4211 Specification for ladders for permanent access to chimneys, other high structures, silos & bins.

BS 4395 Specification for high strength friction grip bolts & associated nuts & washers for structural engineering. General grade.

BS 5395 Stairs, ladders & walkways. Code of practice for the design, construction & maintenance of straight stairs & winders.

BS 5493 Code of practice for protective coating of iron & steel structures against corrosion.

BS 5930 Code of practice for site investigations.

BS 5950 Structural use of steelwork in building. Code of practice for design. Rolled & welded sections.

BS 6399 Loading for building

BS 6651 Code of practice for protection of structures against lightning.

BS 7371 Part 6 / ASTM A123 – A123M : Specification for hot dipped galvanised coatings on Fasteners or steel products .

BS 7430 Code of practice for earthing.

BS 8004 Code of practice for foundations.

BS 8100 Lattice Towers and Masts

BS EN 1011 Welding. Recommendations for welding of metallic materials. General guidance for arc welding

2. Tower Analysis criteria

For the Design of the Foundations the factors of safety shall be limited to 2.0 for uplift and sliding resisted by soil and 1.75 for overturning resisted by concrete using unfactored loads.

The safety factor included in the analysis shall be γ_v = 1.2 on wind speed as prescribed in BS 8100 for upper limit of main road sites. As pressure is derived

from the square of wind speed, the partial factor of safety in member loads therefore shall be 1.22 = 1.44. Member strengths shall incorporate a partial factor of 1.4 for class C structures as specified. (Member strengths shall generally be calculated in accordance with BS 5950 or BS 8100: Part 3: Code of practice for strength assessment of members of lattice towers and masts - were a more detailed analysis of the members may be required).

3. DRAWINGS AND INFORMATION TO BE SUPPLIED BY THE MANUFACTURER

a) General drawing for main items for steel towers.
b) The member taper of each tower in millimetre/meter.
c) The calculated weight of each class and length of member.
d) General information about each tower length and class including tip load, location of point of fixity, type of steel used for the member , cross sectional shape, and connection details of multiple pieces towers (slip joints/flange joints/welded to be one piece).
e) Calculated reactions due to the tip loadings (including shear, moment and axial reactions) in order to demonstrate conformance with the requirements
f) Description of member shaft cross section including thickness of the plate at the bottom.
g) For each standard class tower, provide tower top deflection and twist (rotation) using the specified tip loading in order to demonstrate conformance with the requirements.
h) Main dimensions of concrete foundation, Wight reinforcement, and soil excavation add to that the quantities.

4. Markings

4.1. Each member shall be permanently marked on the member and on the bottom side of the bearing plate with the following identifying information, unless specified otherwise by the owner:
1- Height of tower
2- Installation reference mark.
3- Manufacturer's name
4- Month and year of manufacture
5- Length and class of member
6- Owner's name

4.2. The identification information listed above shall be permanently marked on the transverse side of the pole. The method of identification shall be approved by the owner. The lettering shall be at least 3/4 inch in height.

5. APPROVAL, ACCEPTANCE AND OWNERSHIP

5.1 Final designs must be approved by the owner or owner's representative before material ordering and fabrication. Material ordering and fabrication prior to approval will be at supplier's risk. It is understood that award of this contract does not constitute acceptance of design calculations submitted with the bid, if corrections are required in the final structure designs due to manufacturer's errors, omissions, or misinterpretations of the specifications, the quoted price shall not change. Approval of the drawings and calculations by the owner or the owner's Representative does not relieve the supplier of responsibility for the adequacy of the design, correctness of dimensions, details on the drawings, and the proper fit of parts.

5.2 After delivery, the towers will be inspected and shall be free of dirt, oil blisters, flux, black spots, dross ,teardrop edges, flaking paint or zinc; and in general shall be smooth, attractive, and unscarred. Poles not meeting

مدينة تكنولوجيا الاتصالات والمعلومات
صنعاء - الجمهورية اليمنية
خدمة العملاء 777 777 777 أو 121 مجاناً
info@yemenmobile.com.ye
P.O.Box : 737 Fax : 00967 337999
Tel : 00967 337888

this requirement shall be repaired or replaced by the manufacturer at no additional cost to the owner. Final decision to repair rather than replace a pole shall be at the owner's sole discretion.

5.3 All final drawings shall become the property of the owner, who shall have full rights to reproduce drawings and use them as the owner sees fit.

5.4 Test Reports.

a) All test report should be conducted after the fabrication .

b) Certified mill test reports for all structural material.

c) Certified welding reports for each pole.

d) Impact property test reports showing that the material used in the poles meets the impact properties.

d) Test reports on coating thickness.

e) Report of member testing, when required, including photographs, and diagrams.

5.5. SHIPPING AND DELIVERY

a) Each tower must be shipped alone with all the attachments

b) Each shipment shall be accompanied by a bill of materials, identifiable by pole type and number. Bolts and miscellaneous hardware will be identified by the list for match up with the respective pole shaft. All parts that are required for any one pole shall be in one shipment, if possible.

c) The owner and owner's representative shall be notified prior to shipment that such shipment is to take place, and they reserve the right to inspect the components prior to shipment. The notification shall give quantities, weight, name of common carrier used, and expected time of arrival.

d) Salt-treated wood blocking and urethane foams shall not be used when shipping or storing weathering steel poles.

e) Transportation and site handling shall be performed with acceptable equipment and methods by qualified personnel. The manufacturer shall exercise precaution to protect poles against damage in transit.

f) Handling instructions shall be included with the pole shipment (If special handling is required).

6. Information requirement.

To give us more clear information about the general design and accessories, kindly send the general drawings with main dimensions for the tower and accessories. If you can attach pictures ...it's better

7. Training :

The quotation should include training for tow engineer on tower analysis and design for **14** working days using the program which used In design the required the towers in addition to visiting the factory for getting an good knowledge about fabrication procedure .